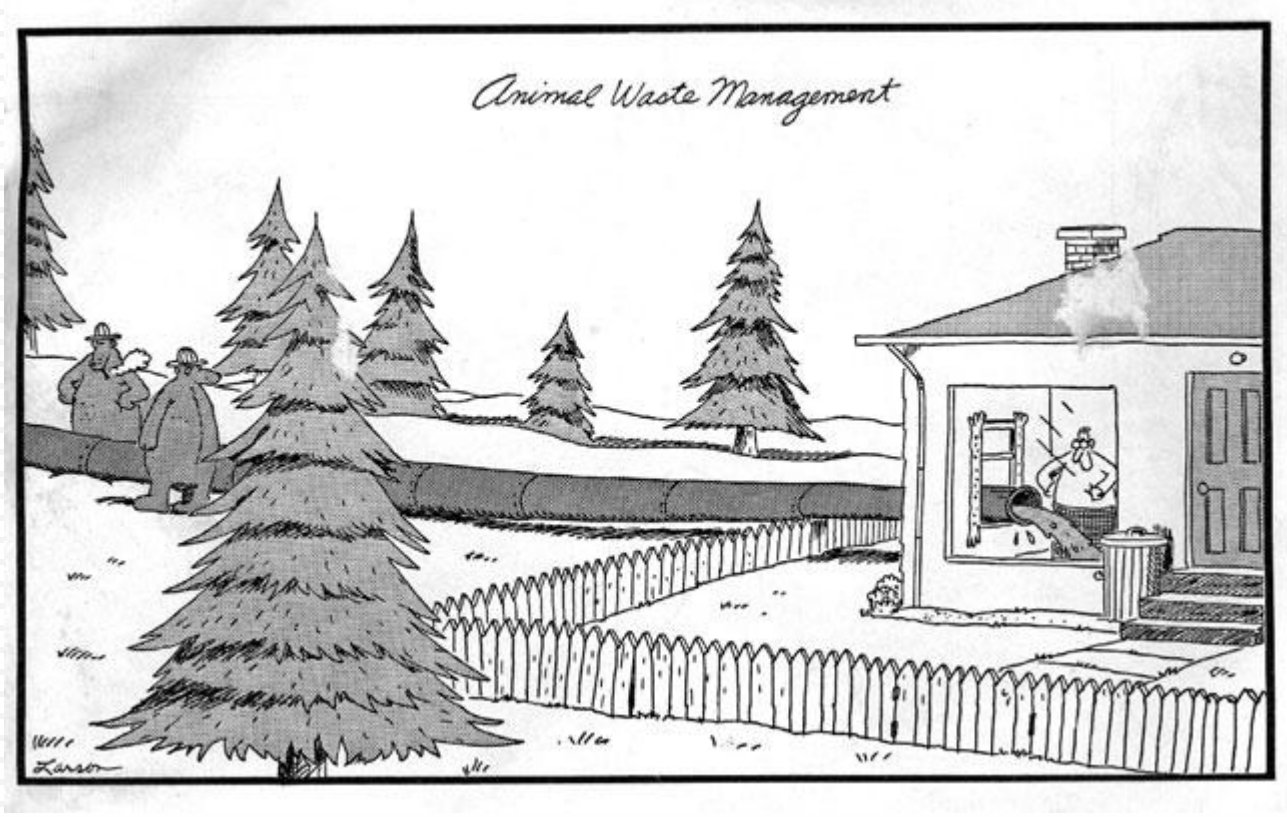
# Us vs. Poop: A Bacteria Reduction Demonstration Project




Project Primarily Funded by:

MISSISSIPPI River Fund

THE McKNIGHT FOUNDATION

# Why Pick on E. coli Bacteria?

(and other interesting tid-bits)

10% can cause illnesses

**Knowledge is Power:** the need for "indicator organisms"

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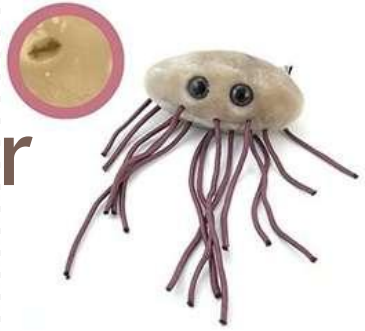
- **Where:** human, livestock, pet, and wildlife waste
- **How:** eating contaminated food, contaminated drinking water or water swallowed while swimming are other sources.
- **Symptoms:** stomach muscle spasms, diarrhea, fever, vomiting
- **Highest Risk Clientele:** Children!

# E. coli- A Tricky Little Bugger



- **Minnesota's water quality standard:**
  - **Chronic:** 126 organisms per 100 milliliters of water (April-October)
  - **Acute:** >10% samples in any calendar month individually exceed 1,260

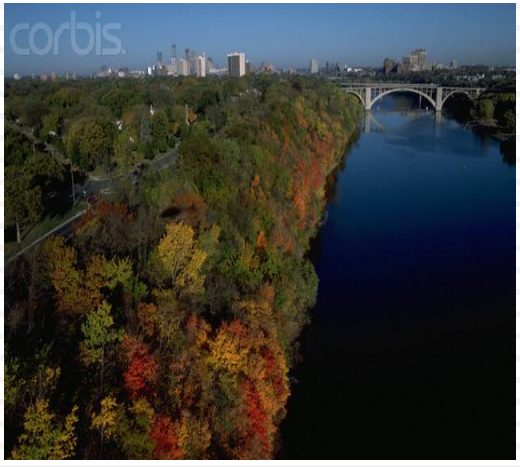
- **"Wet" Sources:**
  - Developed: storm pipes, impervious surfaces, yard waste
  - Agricultural: field applied manure/storage, feedlots w/out runoff controls

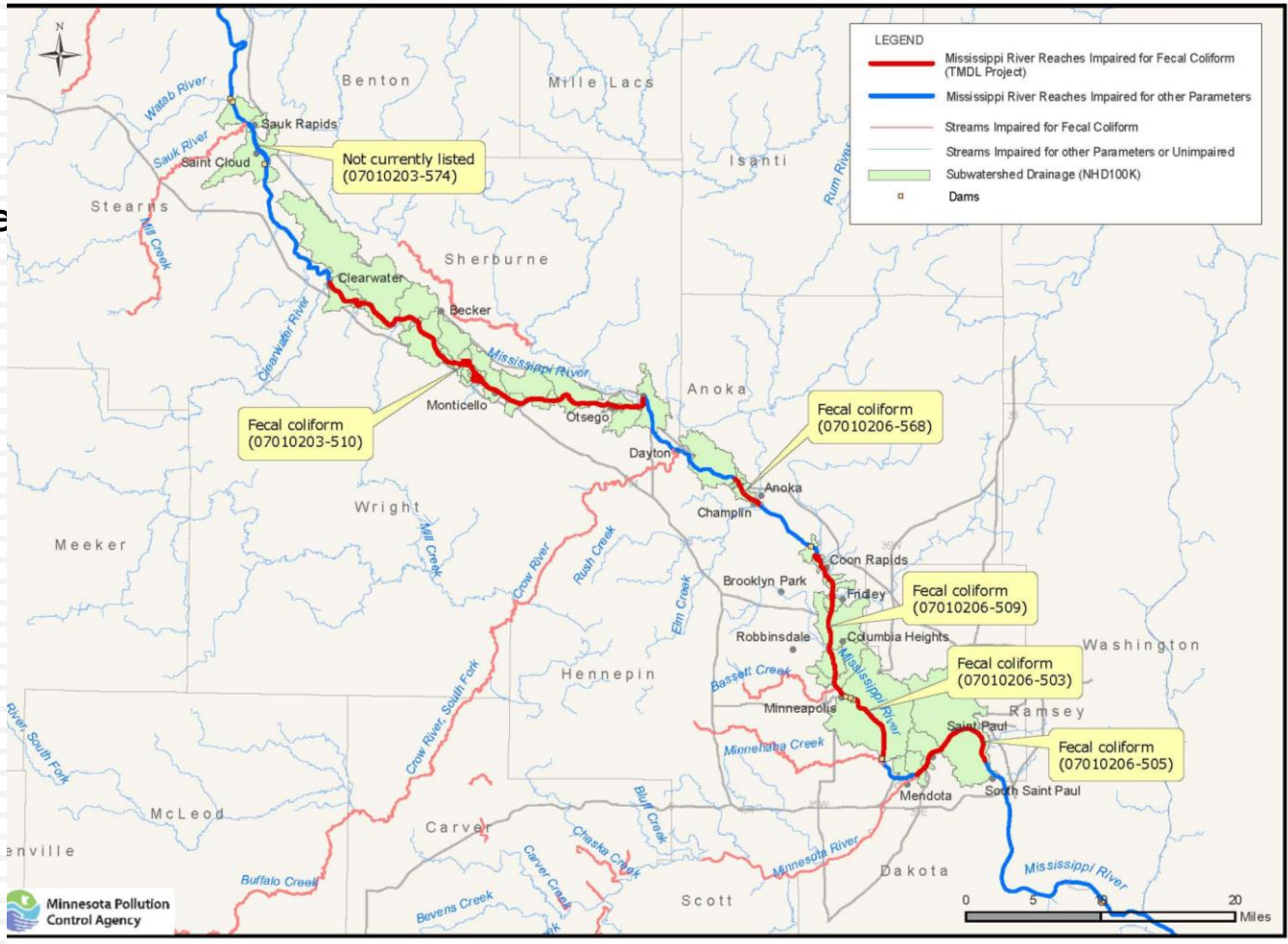
- **"Dry" Sources:**
  - Failing septic systems, animals in water (livestock, geese…)

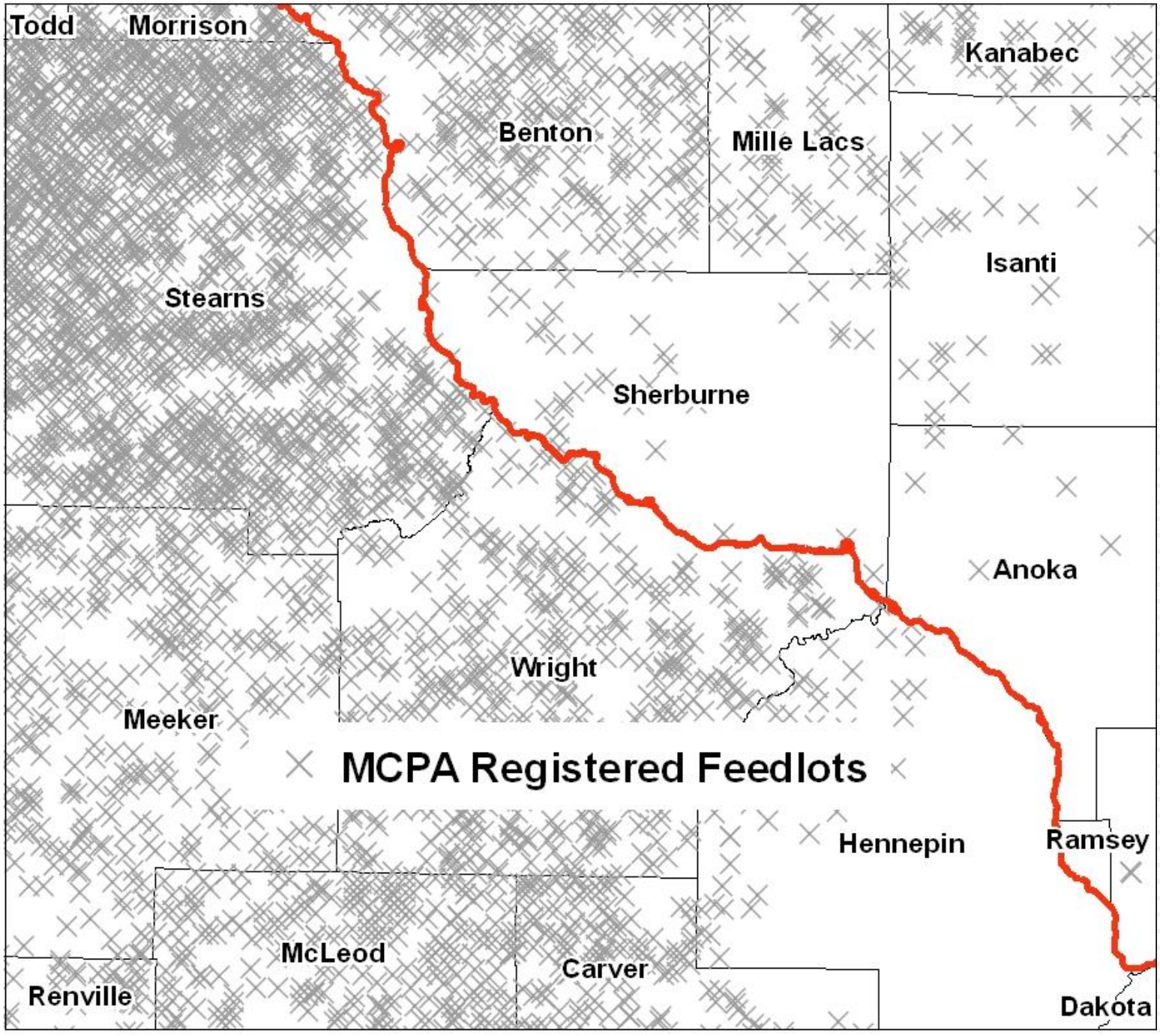
- Some may be **already present** in sediments

# Upper Mississippi Bacteria TMDL

•<u>Initial Data Assessment</u>: indicates an increase in the fall (low flow) but there are exceedances with all flow regimes.




Todd
Morrison
Benton
Mille Lacs
Kanabec
Isanti
Stearns
Sherburne
Anoka
Wright
Meeker
MCPA Registered Feedlots
Hennepin
Ramsey
McLeod
Carver
Renville
Dakota

# Upper Mississippi Bacteria TMDL

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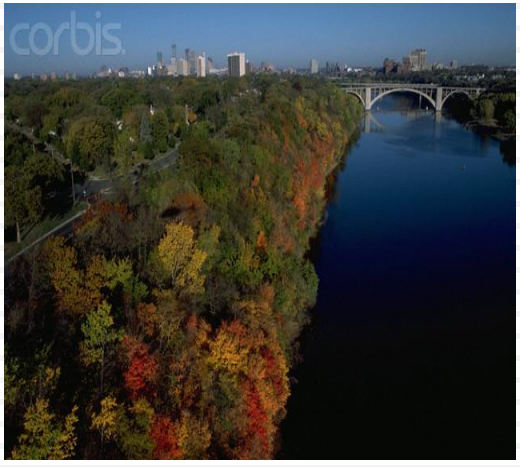
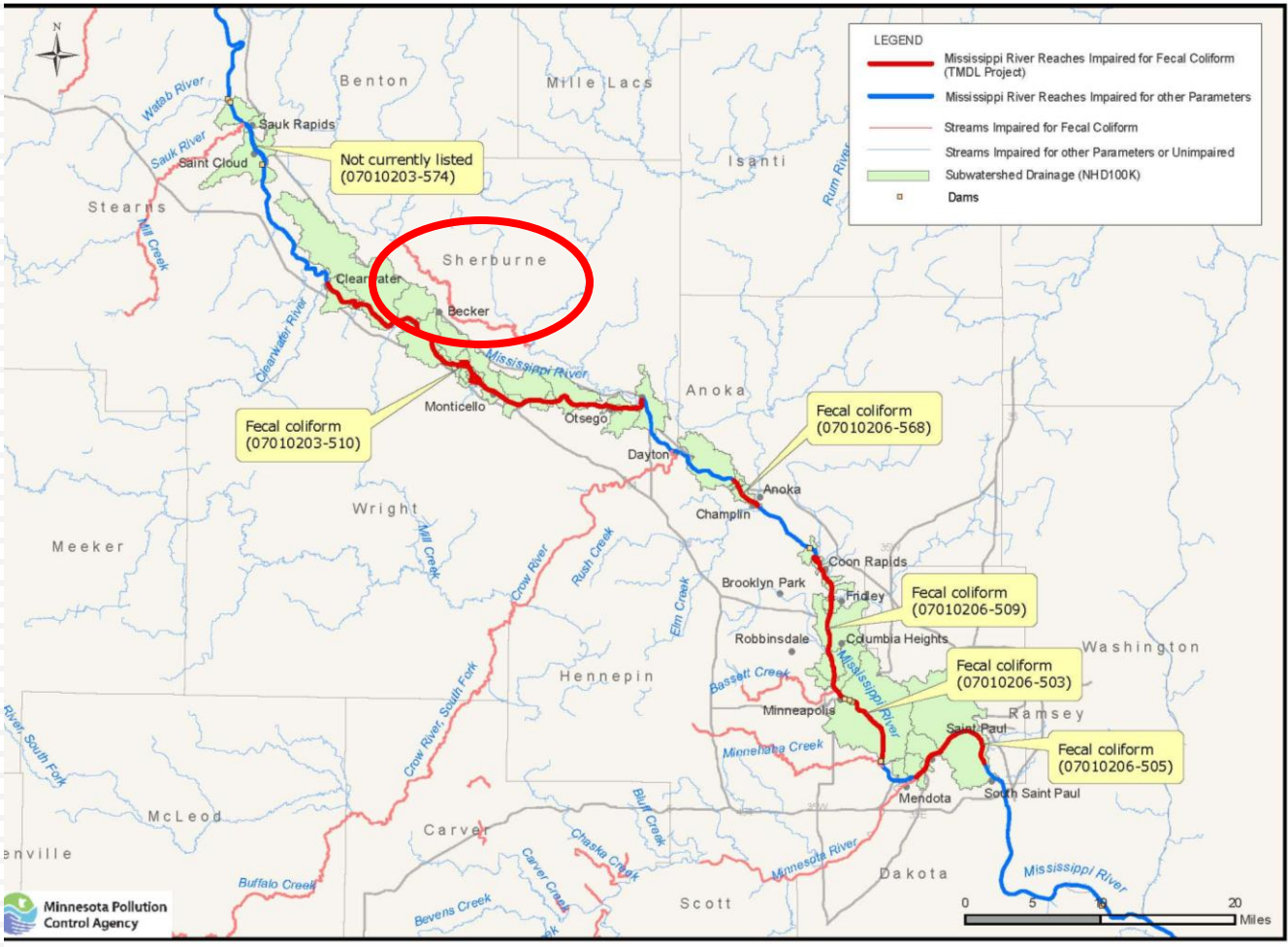


# Elk River Bacteria TMDL

- TMDL indicated no impairment at high flow conditions.

| Sample Month | Total Samples (N) | #> 126 CFU/100 ml | #> 1260 CFU/100 ml | Monthly Geomean |
|---|---|---|---|---|
| April | 19 | 2 | 0 | 19 |
| May | 12 | 0 | 0 | 36 |
| June | 13 | 6 | 0 | 132 |
| July | 12 | 6 | 0 | 127 |
| August | 12 | 10 | 1 | 458 |
| September | 18 | 15 | 0 | 198 |
| October | 13 | 0 | 0 | 29 |

# Reducing Bacteria in Surface Water

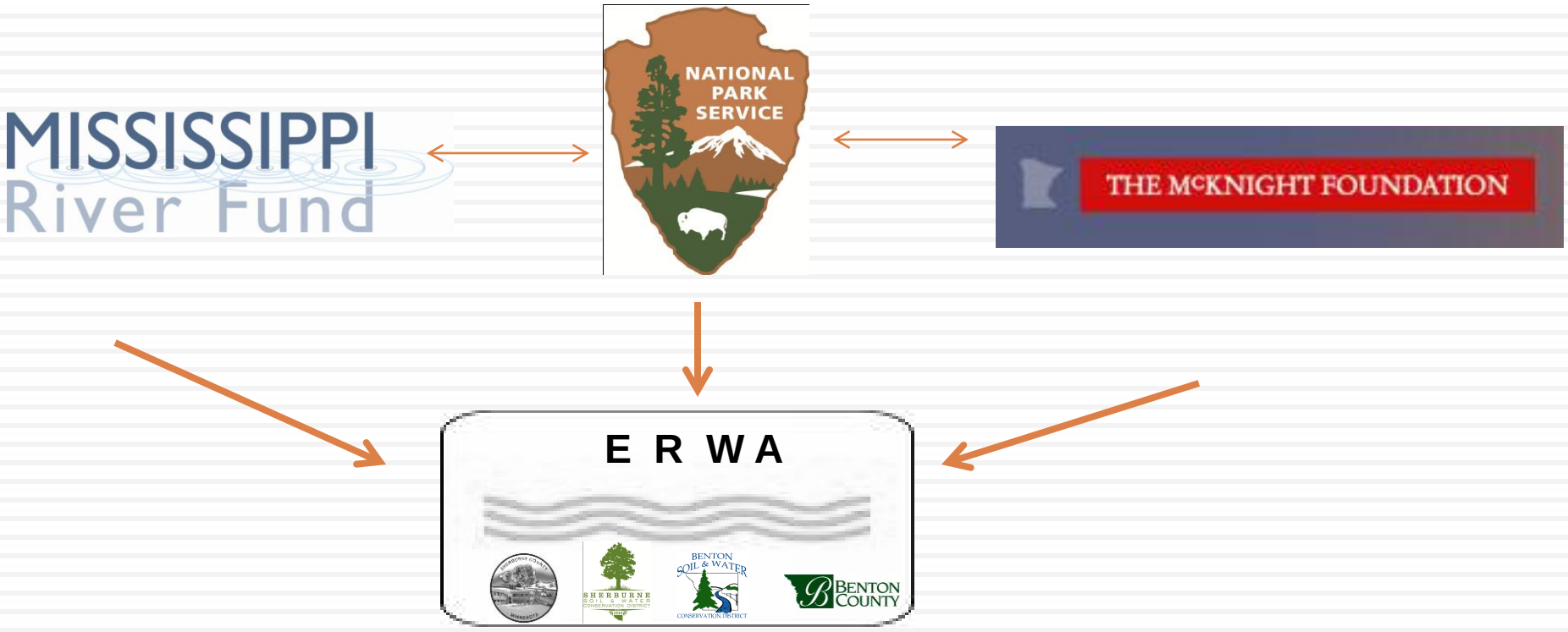
**Ag/Rural Practices:**


Wet: manure management, feedlot runoff controls, riparian buffers/filter strips

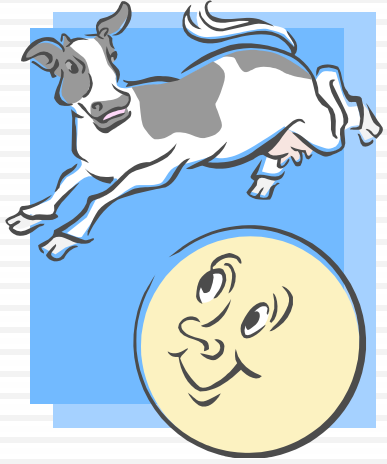
Dry: Upgrade failing SSTS, management of livestock in riparian areas, riparian buffers/filter strips

**<u>Miss River (and Elk River) Bacteria TMDL: Implementation</u>** noted to include manure management, buffers, fencing animal out of streams (in **Ag/Rural areas**)

# Building Partnerships…..



# Demonstration Project Goals



**Primary Goal**: Study and make reductions to bacteria impairments upstream of the National Park.

- Implement buffer strips/livestock management practices on high priority land.- Provide $$
- Monitor water quality data to document the impact of buffer strips/livestock management practices.
- Education

# Bacteria Reduction
# Demonstration Project Wanted

**Before**

**After**

**Sites will be selected by March 15th, 2011.**

If your project is selected funding will be available though a McKnight Foundation grant to assist with project costs.

A project site is needed to demonstrate the effectiveness of Bacteria reduction Best Management Practices. We will be gathering a list of interested parties and selecting up to two projects to be included in this rare demonstration site study. Please see the criteria listed below to determine if your project may be eligible. If you are interested or would like additional information please contact: Tiffany Determan @ 763-241-1170 ext. 3 or tdeterman@sherburneswcd.org,

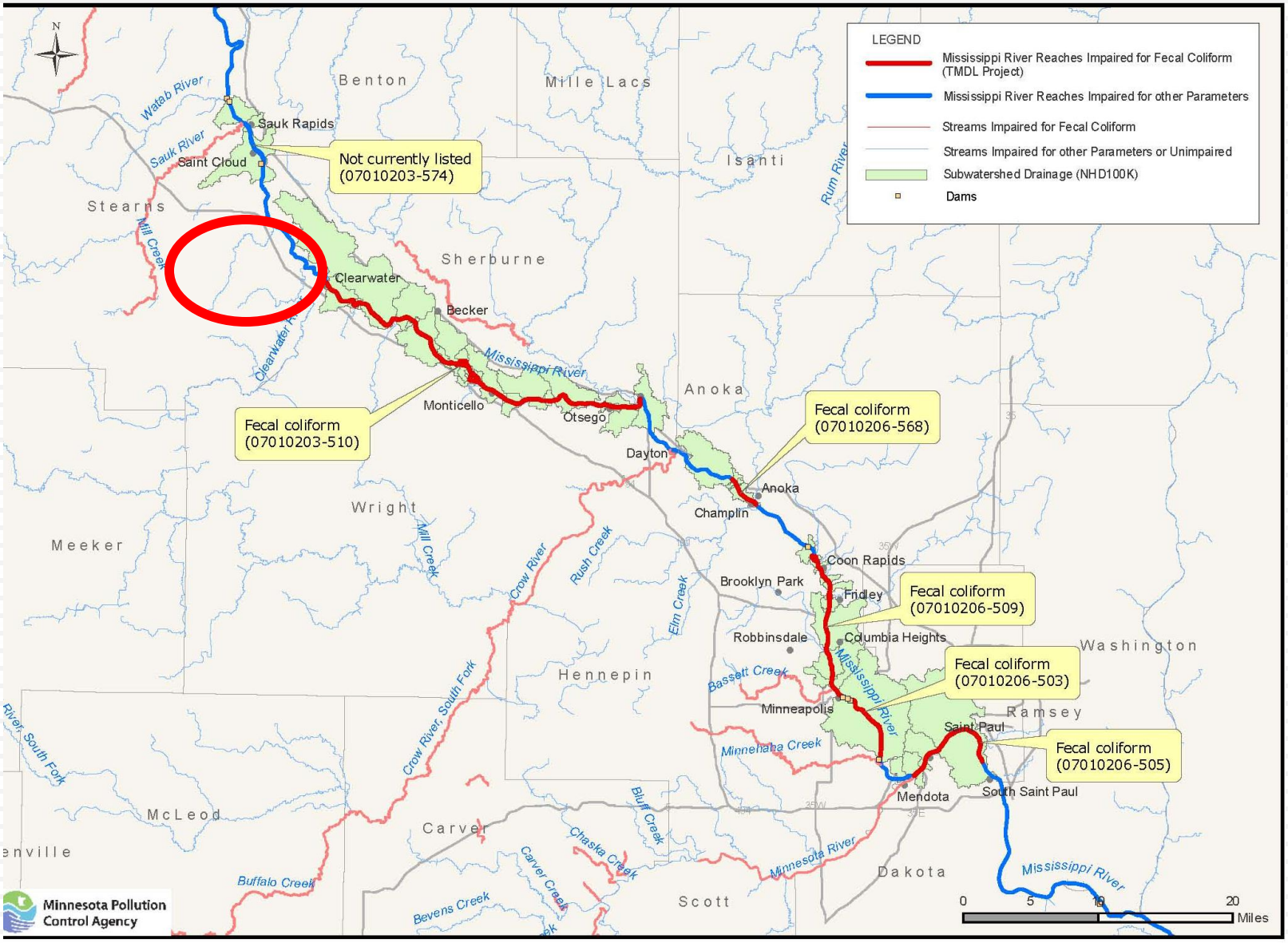
**Criteria for eligible projects:**

- Land must be located within the Elk River Watershed and adjacent to a tributary or ditch.
- Site will have Livestock (cows, horses, buffalo…) that currently have access to the tributary or ditch -or- stockpiled manure with a high probability of runoff.
- Must be willing to implement the BMP determined to be most appropriate.
- Landowner must be willing to allow staff to monitor the water quality for bacterial changes from a minimum of April 2011– October 2013.
- Willing to allow public to view the site during prescheduled tours and/or media events.

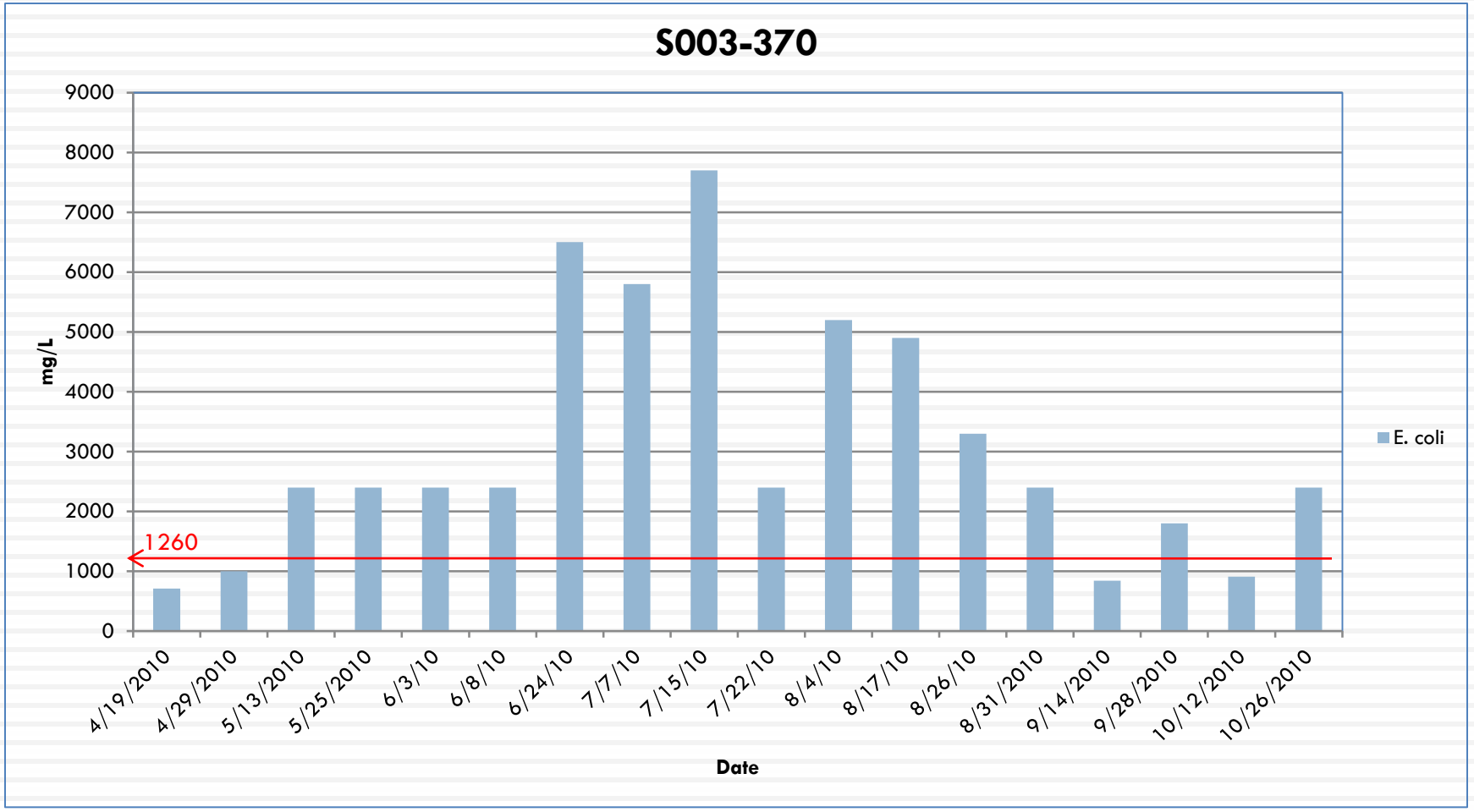
**Sherburne SWCD**
**14855 HWY 10**
**Elk River, MN 55330**
**Phone: 763-241-1170 ext. 3**
**Or**
**tdeterman@sherburneswcd.org**

**Project made possible through a partnership of the following: Elk River Watershed Association, National Park Service ,Mississippi River Fund and the McKnight Foundation**

- Agency Newsletters
- Email listservers (>700 participants)
- Letters to ~400 registered feedlots in two counties
- Adds in local newspapers
- Inquired with local experts (Extension, SWCD, NRCS, MPCA)


LEGEND
Mississippi River Reaches Impaired for Fecal Coliform (TMDL Project)
Mississippi River Reaches Impaired for other Parameters
Streams Impaired for Fecal Coliform
Streams Impaired for other Parameters or Unimpaired
Subwatershed Drainage (NHD100K)
Dams
Not currently listed (07010203-574)
Fecal coliform (07010203-510)
Fecal coliform (07010206-568)
Fecal coliform (07010206-509)
Fecal coliform (07010206-503)
Fecal coliform (07010206-505)
Benton
Mille Lacs
Isanti
Stearns
Sherburne
Anoka
Wright
Meeker
Hennepin
Washington
Ramsey
Carver
Scott
Dakota
McLeod
Sauk Rapids
Saint Cloud
Clearwater
Becker
Monticello
Otsego
Dayton
Anoka
Champlin
Coon Rapids
Brooklyn Park
Fridley
Robbinsdale
Columbia Heights
Minneapolis
Saint Paul
Mendota
South Saint Paul
Watab River
Sauk River
Mill Creek
Clearwater River
Mississippi River
Rum River
Crow River
Rush Creek
Elm Creek
Bassett Creek
Minnehaha Creek
Crow River, South Fork
Bluff Creek
Chaska Creek
Carver Creek
Minnesota River
Buffalo Creek
Bevens Creek
0 5 10 20 Miles
Minnesota Pollution Control Agency

# Johnson Creek Bacteria!



# More Partners…..

MISSISSIPPI River Fund

NATIONAL PARK SERVICE

THE McKNIGHT FOUNDATION

E R W A

Minnesota Pollution Control Agency

STEARNS COUNTY SOIL & WATER SWCD CONSERVATION DISTRICT

Environmental Services Department COUNTY OF STEARNS

NRCS

**Johnson Creek, Stearns County**

# Planned Schedule

# Demonstration Site

# Streambanks: before

# Feedlot Area: Before

# Project Components
## (As funded by the McKnight Foundation)

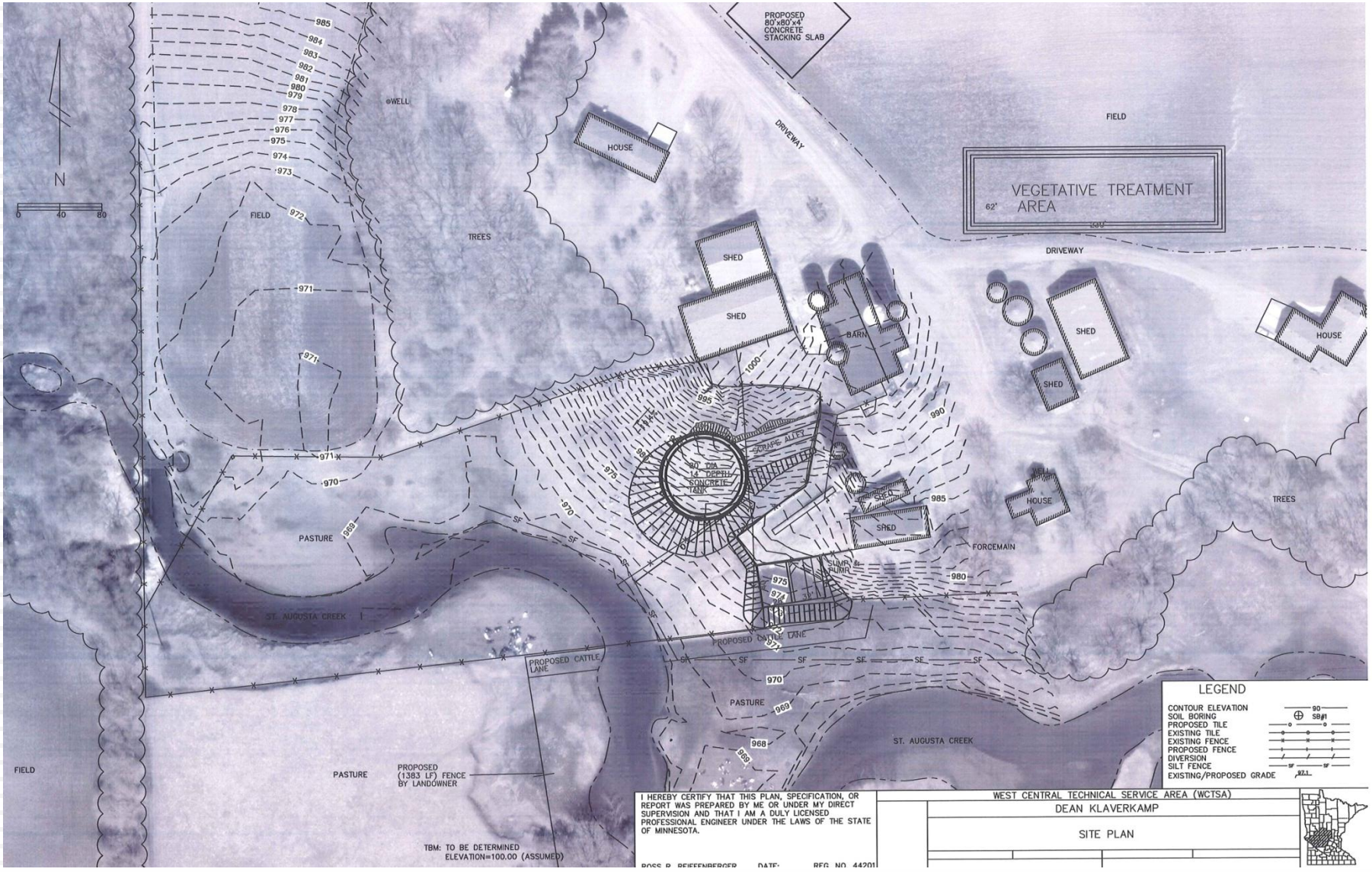
1) 2400 linear feet of fencing along streambanks (completed November 2011)
2) 4.5 acres of re-established vegetation along streambanks
3) Livestock Crossing (16’ wide improved fenced lane)-prescribed grazing


7B
Critical Area Planting
1.0 ac.
1 - 0.9ac.
3 - 1.0 ac.
Riparian Seeding 3.5 ac.
2 - 1.6 ac.
465

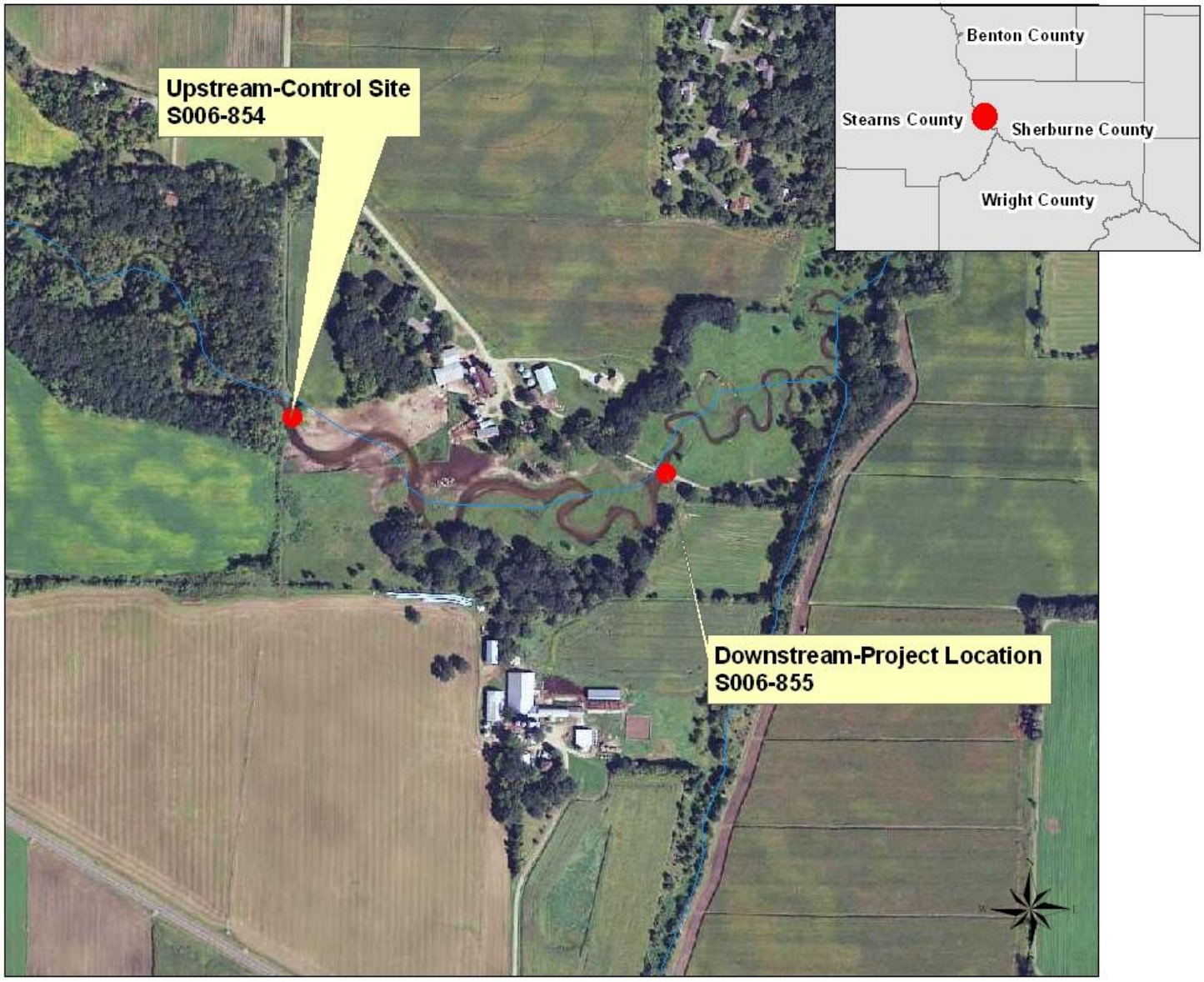
# Project Components
## (Federally Funded)

1) Concrete Storage Tank or Slurry Storage- for liquids
2) Concrete Stacking Slab-for solids
3) Settling Basin- collects runoff from feedlot
4) Vegetative Treatment/filter area

# Federally Funded Components

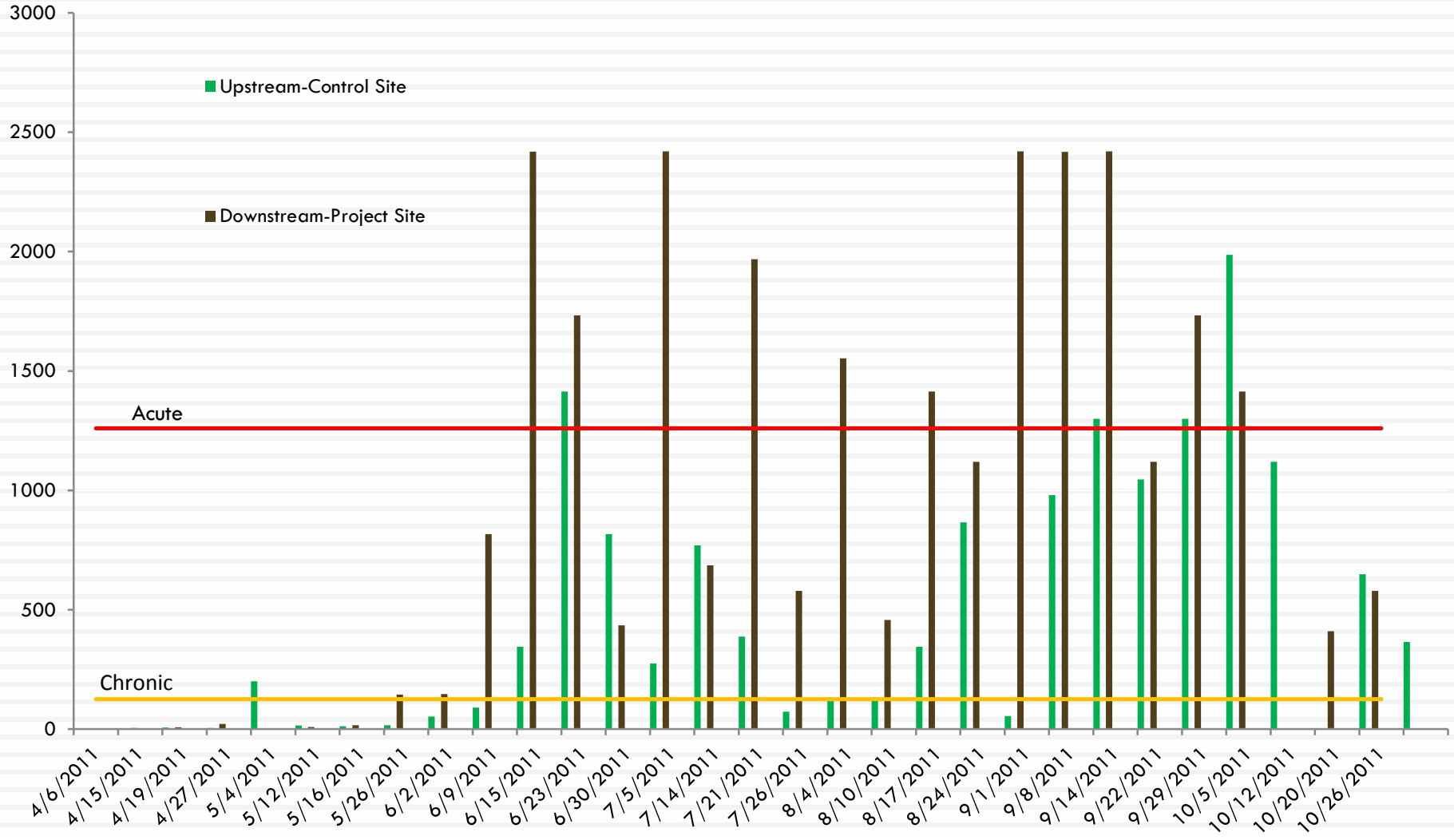


# Monitoring Plan

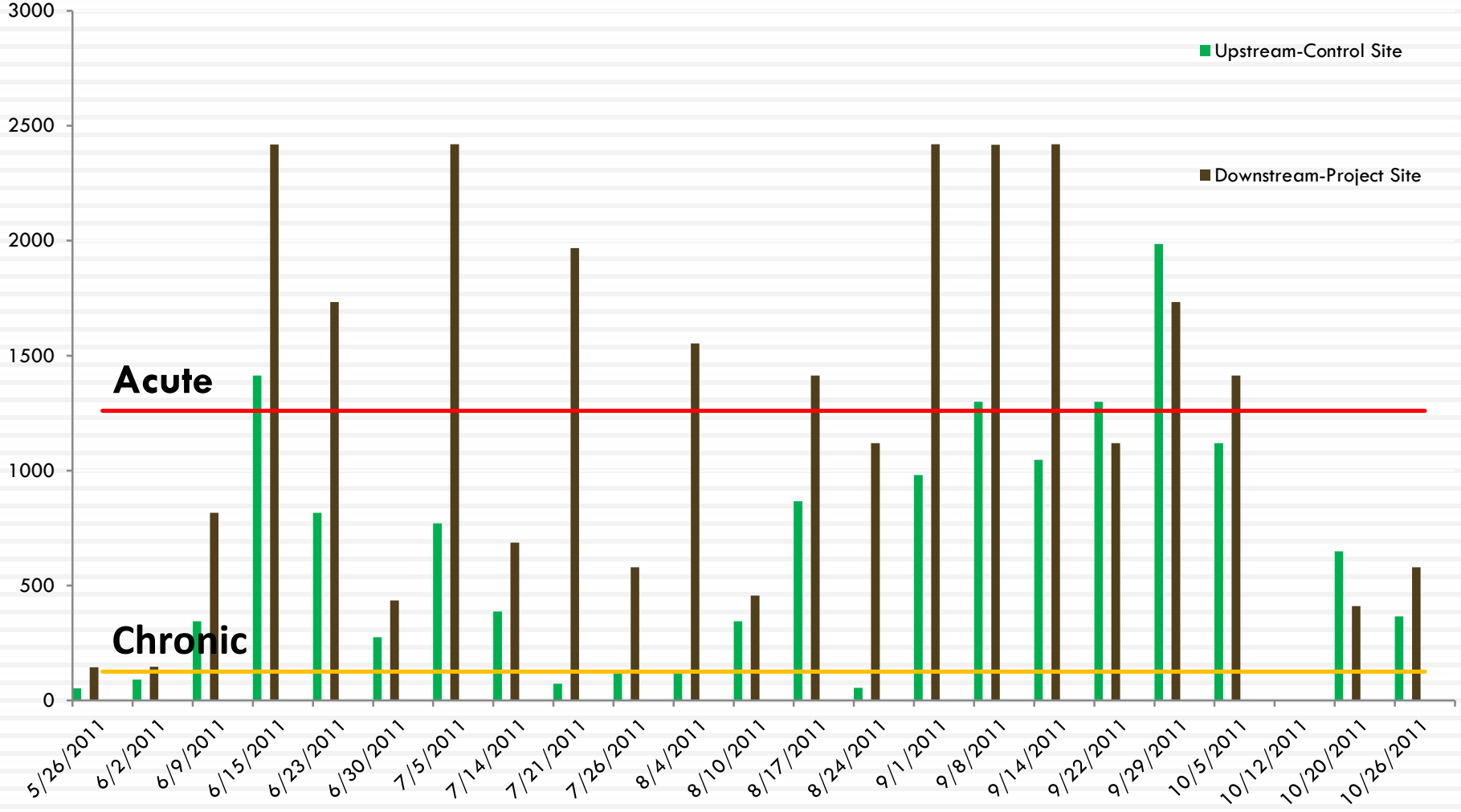


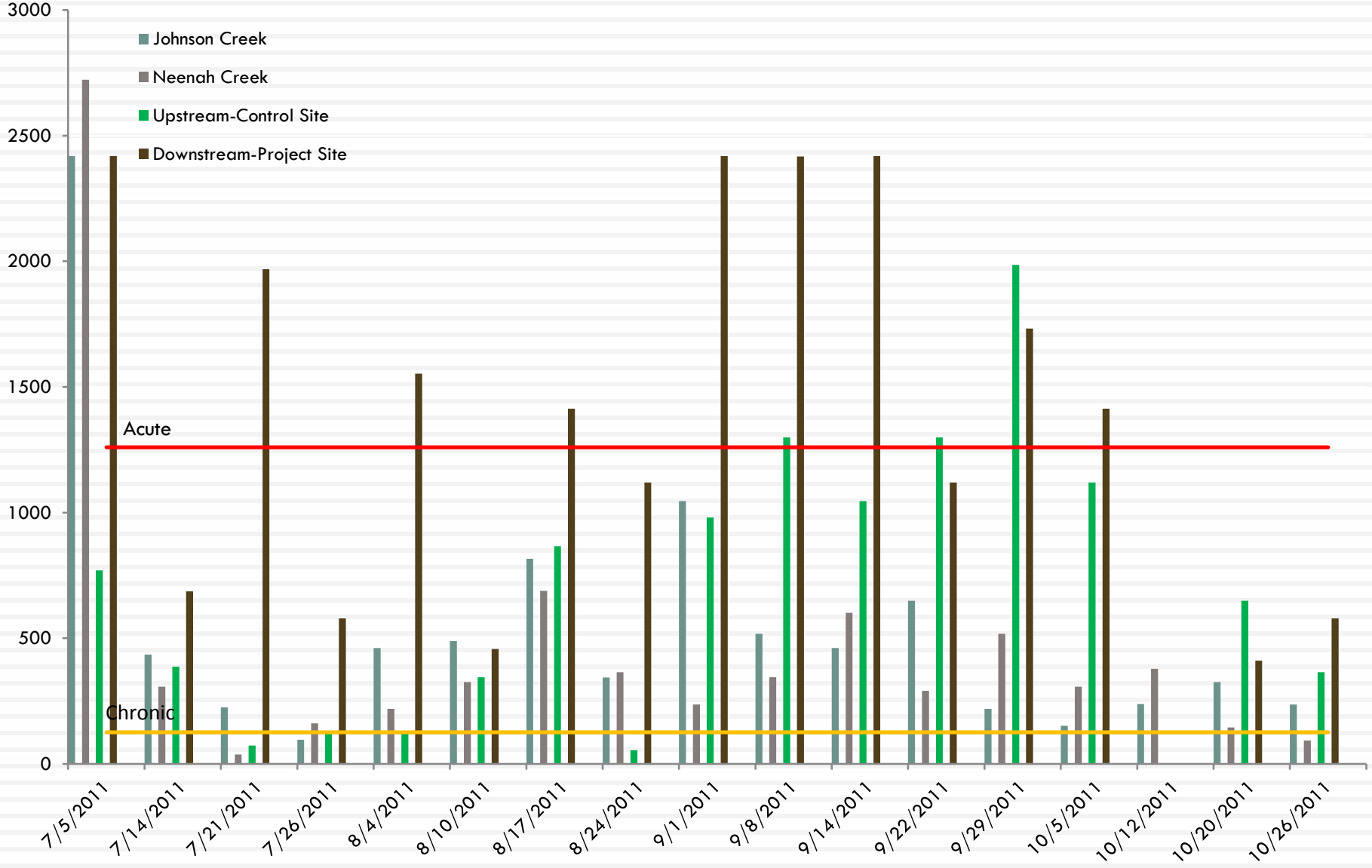
# Additional Monitoring Locations

# Upstream-Downstream Concentrations

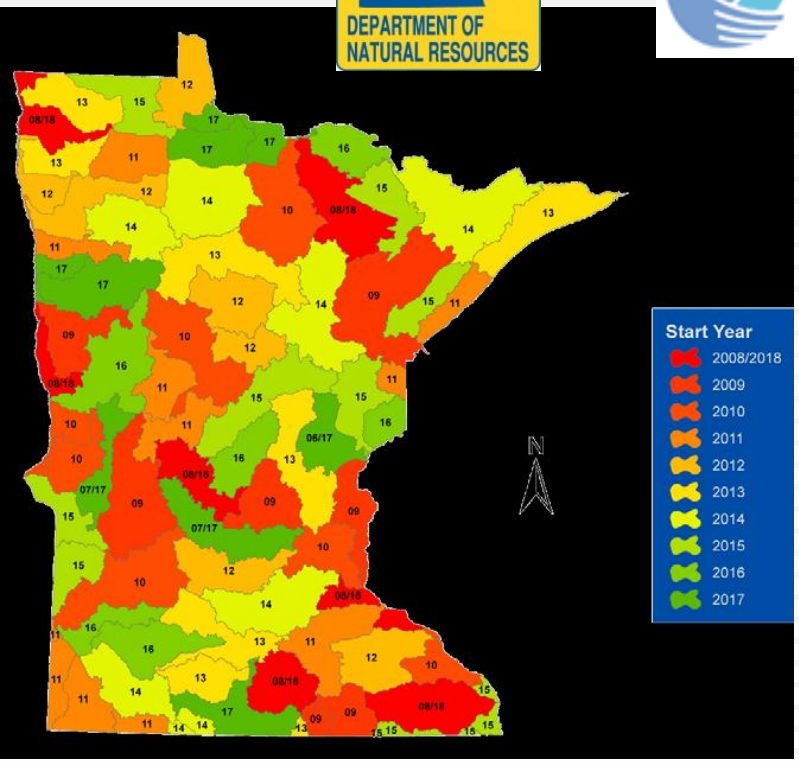


# E. Coli Concentrations




3000
2500
2000
1500
1000
500
0
Johnson Creek
Neenah Creek
Upstream-Control Site
Downstream-Project Site
Acute
Chronic
7/5/2011
7/14/2011
7/21/2011
7/26/2011
8/4/2011
8/10/2011
8/17/2011
8/24/2011
9/1/2011
9/8/2011
9/14/2011
9/22/2011
9/29/2011
10/5/2011
10/12/2011
10/20/2011
10/26/2011

# Miss. River (St. Cloud) Watershed Project




# And Now Deep Thoughts…

Don't be afraid to start a conversation/ask questions

It never hurts to put yourself in an uncomfortable situation

Think outside the box (or in this case outside the political boundaries)

Unconventional Partnerships are cool

Maybe in order to understand mankind we have to look at that word itself. MANKIND. Basically, it's made up of two separate words "mank" and "ind." What do these words mean? It's a mystery and that's why so is mankind.

--Jack Handy

# Livestock Riparian Access Control

- 22-35% decrease in bacteria concentration with elimination of livestock access to riparian areas (determined via model).
- Study with 84% of stream length fenced to exclude livestock access found .1% of total annual E coli load from livestock
- **One study found that bacteria in cow pies grew for 6-14 days after "deposited"!

Literature Review completed and summarized by Emmons & Olivier Resources, Inc. for MPCA

# Contacts:

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tdeterman@sherburneswcd.org

763-241-1170 x 132

Lark Weller

National Park Service

Lark_weller@nps.gov

651-293-8442

# Literature

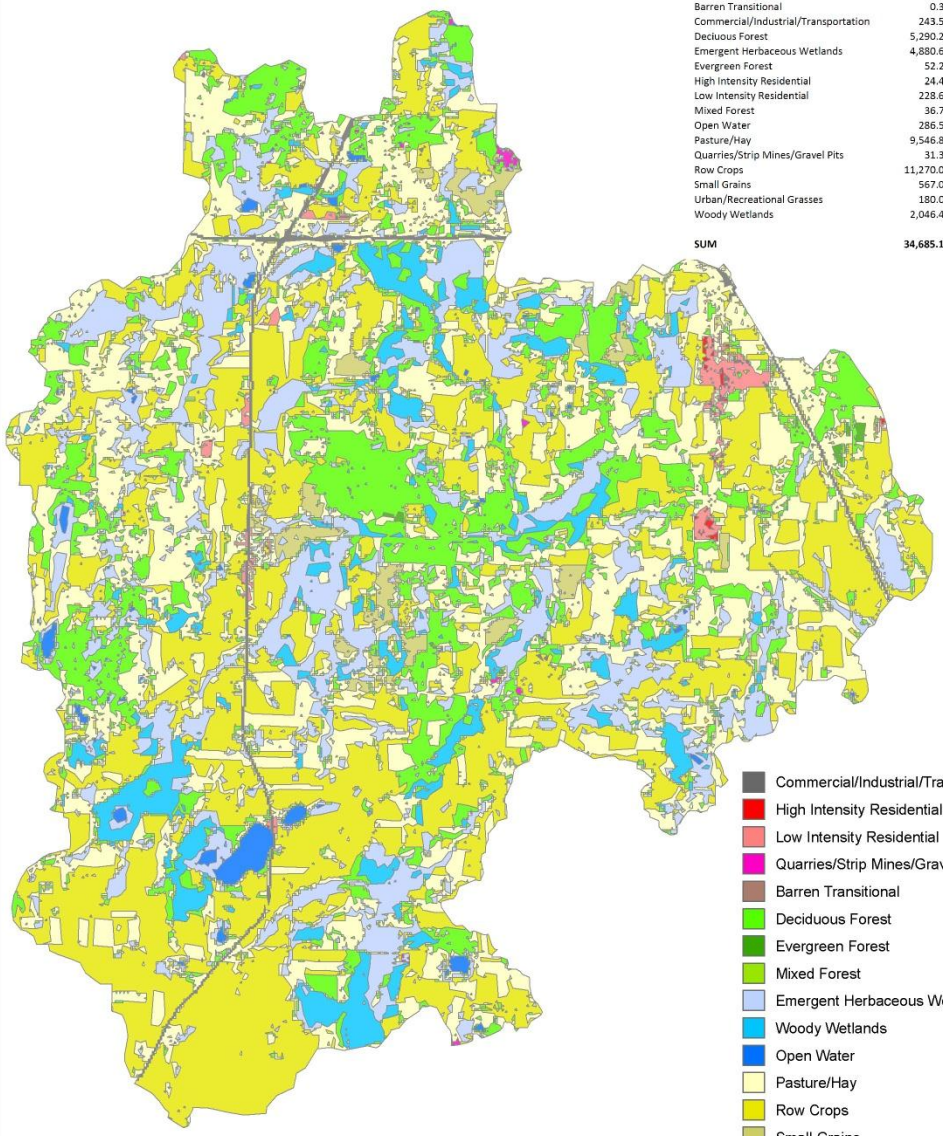
- http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/tmdl-projects/upper-mississippi-river-basin-tmdl-projects/project-upper-mississippi-river-bacteria.html?menuid=&redirect=1

# Johnson Creek Watershed

## Landuse

April 2012

| Landuse | Acres | % |
|---|---|---|
| Barren Transitional | 0.36 | 0.0% |
| Commercial/Industrial/Transportation | 243.53 | 0.7% |
| Deciuous Forest | 5,290.27 | 15.3% |
| Emergent Herbaceous Wetlands | 4,880.63 | 14.1% |
| Evergreen Forest | 52.29 | 0.2% |
| High Intensity Residential | 24.40 | 0.1% |
| Low Intensity Residential | 228.64 | 0.7% |
| Mixed Forest | 36.74 | 0.1% |
| Open Water | 286.53 | 0.8% |
| Pasture/Hay | 9,546.80 | 27.5% |
| Quarries/Strip Mines/Gravel Pits | 31.31 | 0.1% |
| Row Crops | 11,270.04 | 32.5% |
| Small Grains | 567.09 | 1.6% |
| Urban/Recreational Grasses | 180.01 | 0.5% |
| Woody Wetlands | 2,046.49 | 5.9% |
| SUM | 34,685.13 | |




N

0 0.5 1 2 3 4

Miles

National Land Cover Data (USGS/EPA)
Version 05-20-2000